

ABSTRACT

A laser having an optical parametric oscillator for providing a preselected wavelength beam is provided. A nonlinear crystal cut for phase matching condition preferably cut for noncritical phase matching conditions for the fundamental beam wavelength and the preselected wavelength beam is located in both the optical parametric oscillator cavity and laser resonator cavity.

The optical axis of the laser resonator and the optical axis of the optical parametric oscillator cavity are at least partially separate and partially overlap. The laser crystal is located in the laser resonator cavity but not in the optical parametric oscillator cavity. Each end of the OPO nonlinear crystal that intersects the optical axes has a Brewster cut for both the fundamental and preselected wavelength beams so that the fundamental and preselected wavelength beams incident on the nonlinear crystal at approximately the Brewster angle and pass through without substantial reflection loss.

The fundamental wavelength beam is directed into the optical parametric oscillator cavity and incidents on nonlinear crystal having a Brewster cut at each end for fundamental and preselected wavelength beam without substantial reflection loss. A portion of the fundamental wavelength beam is partially converted to a preselected wavelength beam. The fundamental beam and the preselected wavelength beams are reflected back through the nonlinear crystal. Preselected wavelength beam is separated from the fundamental wavelength beam.